J Am Coll Cardiol (2004);43:1291-8
Reduction of "no-reflow" phenomenon by intra-aortic balloon counterpulsation in a randomized magnetic resonance imaging experimental study
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OBJECTIVES: Intra-aortic balloon counterpulsation (IABC) can improve post-myocardial infarction (MI) outcomes, but the mechanisms of such effect remain unclear. We hypothesized that IABC augmentation reduces the extent of microvascular obstruction after acute infarction. BACKGROUND: Microvascular obstruction or "no-reflow" (MO) has been shown to negatively influence left ventricular (LV) remodeling after myocardial infarction (MI). METHODS: Seventeen dogs underwent 90 min of coronary artery occlusion followed by reperfusion. Animals were then randomized to either IABC (n = 9) or control (n = 8); IABC augmentation was performed for 24 h after MI. Microvascular obstruction and infarct size by first-pass and delayed contrast-enhanced magnetic resonance imaging (MRI) were measured at 1 and 24 h after reperfusion and compared with postmortem infarct size and MO by microspheres. RESULTS: Microvascular obstruction by MRI, expressed as percent LV mass, decreased significantly in IABC (4.9 +/- 2.2% to 3.6 +/- 1.5%) and increased in controls (3.4 +/- 0.5% to 4.9 +/- 1.1% from 1 to 24 h, respectively; $p < 0.001$). Similar results were found for MO defined by microspheres. In the control group, MO increased significantly, during 24 h of study (from 8.8 +/- 1.7% to 43.2 +/- 11.1% of infarcted myocardium; $p < 0.05$), whereas not important change was observed in the IABC group (from 21.3 +/- 7.1% to 25.8 +/- 14.7%; $p < 0.05$ vs. control at 24 h). Infarct size, measured by MRI, increased in both groups (13.2 +/- 1.8 to 15.5 +/- 2.1 from 1 to 24 h, respectively; $p < 0.05$). CONCLUSIONS: Intra-aortic balloon counterpulsation augmentation performed after reperfusion improves myocardial perfusion at the tissue level, and reduces the extent of no-reflow caused by microvascular obstruction.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15063444

Heart (2004);90:87-91
Interventional magnetic resonance imaging for guiding gene and cell transfer in the heart
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BACKGROUND: Interventional magnetic resonance imaging (iMRI) has the potential for guiding interventional cardiac procedures in real time. OBJECTIVES: To test the feasibility of iMRI guided gene and cell transfer to the heart and to monitor myocardial remodelling after myocardial infarction in a rat model. METHODS: The MRI contrast agent GdDTPA, together with either Evans blue dye, or a recombinant adenovirus encoding the LacZ gene, or primary fibroblasts tagged by BrdU, were injected into the myocardium of rats under iMRI guidance. Rats were killed seven days after the injection and the hearts sectioned to identify the blue dye, LacZ expression, or fibroblast presence, respectively. In a parallel study, left ventricular area was measured before and after myocardial infarction and in sham operated rats by T1 weighted MRI and by echocardiography. RESULTS: Location of GdDTPA enhancement observed with iMRI

at the time of injection was correlated with Evans blue stain, beta-gal expression, and the primary fibroblast location in histological studies. iMRI and echocardiography measured a comparable increase in left ventricular area at seven and 30 days after myocardial infarction. A good correlation was found between the iMRI and echocardiographic assessment of left ventricular area ($r = 0.70$; $p < 0.0001$) and change in left ventricular area with time ($r = 0.75$; $p < 0.0001$). CONCLUSIONS: The results show the feasibility and efficiency of iMRI guided intramyocardial injections, and the ability to monitor heart remodelling using iMRI. Genes, proteins, or cells for tissue engineering could be injected accurately into the myocardial scar under iMRI guidance.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=14676253

Am J Cardiol (2004);94:354-7
Assessment of biventricular remodeling by magnetic resonance imaging after successful primary stenting for acute myocardial infarction
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Inferior acute myocardial infarction (AMI) is associated with a better outcome compared with anterior AMI, even in the presence of comparable infarct size. Whether left ventricular remodeling, a major predictor of poor outcome, and right ventricular (RV) remodeling depend on the site of an AMI remains unknown. Biventricular volumes were assessed by magnetic resonance imaging 7 +/- 2 days and 3.4 +/- 0.3 months after successful primary stenting in 51 consecutive patients with inferior or anterior AMI. This study documents RV involvement and biventricular reverse remodeling in patients with inferior AMI in the absence of RV infarction, as opposed to those with anterior AMI who show progressive biventricular remodeling.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15276104

Circulation (2004);110:1463-6
In vivo magnetic resonance imaging of coronary thrombosis using a fibrin-binding molecular magnetic resonance contrast agent
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BACKGROUND: The advent of fibrin-binding molecular magnetic resonance (MR) contrast agents and advances in coronary MRI techniques offers the potential for direct imaging of coronary thrombosis. We tested the feasibility of this approach using a gadolinium (Gd)-based fibrin-binding contrast agent, EP-2104R (EPIX Medical Inc), in a swine model of coronary thrombus and in-stent thrombosis. METHODS AND RESULTS: Ex vivo and in vivo sensitivity of coronary MR thrombus imaging was tested by use of intracoronarily delivered Gd-DTPA-labeled fibrinogen thrombi (n=6). After successful demonstration, in-stent coronary thrombosis was induced by x-ray-guided placement of thrombogenic-coated, MR-lucent stents (n=5). After stent placement, 60 micromol of EP-2104R was injected via the left main coronary artery. Free-breathing, navigator-gated 3D coronary MR angiography and thrombus imaging were performed

(1) before and after stent placement and (2) before and after EP-2104R. Thrombi were confirmed by x-ray angiography and autopsy. Fibrinogen thrombi: 5 of 6 intracoronarily delivered Gd-labeled fibrinogen clots (approximately 250 micromol/L Gd) were visible on MRI and subsequently confirmed by x-ray angiography. In-stent thrombi: in-stent thrombosis was observed in all stents after EP-2104R. Four of 5 thrombi were confirmed by x-ray angiography. Chemical analysis of 2 thrombi demonstrated 99 to 147 micromol/L Gd. CONCLUSIONS: We demonstrate the feasibility of MRI of coronary thrombus and in-stent thrombosis using a novel fibrin-binding molecular MR contrast agent. Potential applications include detection of coronary in-stent thrombosis or thrombus burden in patients with acute coronary syndromes.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15238457

Circulation (2004);109:2023-9
In vivo molecular imaging of acute and subacute thrombosis using a fibrin-binding magnetic resonance imaging contrast agent
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BACKGROUND: Plaque rupture with subsequent thrombosis is recognized as the underlying pathophysiology of most acute coronary syndromes and stroke. Thus, direct thrombus visualization may be beneficial for both diagnosis and guidance of therapy. We sought to test the feasibility of direct imaging of acute and subacute thrombosis using MRI together with a novel fibrin-binding gadolinium-labeled peptide, EP-1873, in

Illinois 60611, USA.
Contrast-enhanced cardiac MRI (ceMRI) and TIMI myocardial perfusion grade analysis (TMPG) are proven methods for visualization of microinfarction and assessment of microvascular perfusion, respectively. To determine whether microvascular obstruction accounts for procedure-related myonecrosis, 14 poststent patients, 9 with procedural CK-MB elevation and 5 controls, underwent ceMRI and TMPG. All had TIMI 3 flow pre- and poststent. TMPG was normal in 12/14 pre- and 7/14 poststent. Those with poststent decline in TMPG had higher CK-MB (median, 41.0 vs. 7.4 ng/mL; P = 0.01) and larger infarct mass (median, 3.1 vs. 0.89 g; P = 0.04). More extensive myonecrosis (CK-MB > 3 x normal; infarct mass > 3 g) was observed more frequently if there was a poststent decline in TMPG (3/3, 100%, vs. 2/11, 18.2%; P = 0.03). These data support the theory that distal embolization and microvascular obstruction are associated with myonecrosis following otherwise successful coronary stent placement and provide further insight into its pathophysiology.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15065140

Lancet (2004);363:2162-71
Role of MRI in clinical cardiology
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Rapid progress has been made in cardiac MRI (CMRI) over the past decade, which has firmly established it as a reliable and clinically important technique for assessment of cardiac structure, function, perfusion, and myocardial viability. Its versatility and accuracy is unmatched by any other individual imaging modality. CMRI is non-invasive and has high spatial resolution and avoids use of potentially nephrotoxic contrast agent or radiation. It has been extensively studied against other established non-invasive imaging modalities and has been shown to be superior in many scenarios, particularly with respect to assessment of cardiac and great vessel morphology and left ventricular function. Furthermore, its clinical use continues to expand with increasing experience and proliferation of CMRI centres. As worldwide prevalence of cardiovascular disease continues to rise, CMRI provides opportunity for improved and cost-effective non-invasive assessment. Continued progress in CMRI technology promises to further widen its clinical application in coronary imaging, myocardial perfusion, comprehensive assessment of valves, and plaque characterisation.

clinical value have been of limited sample size. METHODS: We identified all studies (MEDLINE and EMBASE) that evaluated CAD by both CMRA and conventional angiography in >/=10 subjects during the period 1991 to January 2004. We recorded true and false positive and true and false negative CMRA assessments for detection of CAD using X-ray angiography as the reference standard. Analysis was done at segment, vessel, and subject level. RESULTS: We analyzed 39 studies (41 separate comparisons). Across 25 studies (27 comparisons) with data on 4,620 segments (993 subjects), sensitivity and specificity for detection of CAD were 73% and 86%, respectively. Vessel-level analyses (16 studies, 2,041 vessels) showed sensitivity 75% and specificity 85%. Subject-level analyses (13 studies, 607 subjects) showed sensitivity 88% and specificity 56%. At the segment level, sensitivity was 69% to 79% for all but the left circumflex (61%) coronary artery; specificity was 82% to 91%. There was considerable between-study heterogeneity, but weighted summary receiver-operating characteristic curves agreed with these estimates. There were no major differences between subgroups based on technical or population characteristics, year of publication, reported blinding, or sample size. CONCLUSIONS: In evaluable segments of the native coronary arteries, CMRA has moderately high sensitivity for detecting significant proximal stenoses and may have value for exclusion of significant multivessel CAD in selected subjects considered for diagnostic catheterization.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15519021

Eur Heart J (2004);25:1657-65
Detection of coronary artery disease by magnetic resonance myocardial perfusion imaging with various contrast medium doses: first European multi-centre experience
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AIMS: Magnetic resonance (MR) first-pass myocardial perfusion imaging during

sensitivities/specificities (95% confidence intervals) for pooled doses 2/3 were 93% (77-99%; ns vs. dose 1) and 75% (48-92%;p<0.05 vs. dose 1), respectively. CONCLUSIONS: With increasing doses of CM, a higher signal response in the myocardium was achieved and consequently this stress-only protocol, with CM doses of 0.10-0.15 mmol/kg combined with a semi-automatic analysis, yielded a high diagnostic performance for the detection of CAD.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15351166

Circulation (2004);110:3457-64
Assessment of myocardial viability by intracellular 23Na magnetic resonance imaging
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BACKGROUND: Because of rapid changes in myocardial intracellular Na+ (Na+(i)) during ischemia and reperfusion (R), 23Na magnetic resonance imaging (MRI) appears to be an ideal diagnostic modality for early detection of myocardial ischemia and viability. So far, cardiac 23Na MRI data are limited and mostly concerned with imaging of total Na+. For proper interpretation, imaging of both Na+(i) and extracellular Na+ is essential. In this study, we tested whether Na+(i) imaging can be used to assess viability after low-flow (LF) ischemia. METHODS AND RESULTS: Isolated rat hearts were subjected to LF (1%, 2%, or 3% of control coronary flow) and R. A shift reagent was used to separate Na+(i) and extracellular Na+ resonances. Acquisition-weighted 23Na chemical shift imaging (CSI) was alternated with 23Na MR spectroscopy. Already during control perfusion, Na+(i) could be clearly seen on the images. Na+(i) image intensity increased with increasing severity of ischemia. During R, Na+(i) image intensity remained highest in 1% LF hearts. Not only did we find very good correlations between Na+(i) image intensity at end-R and end-diastolic pressure (R=0.85, P<0.001) and recovery of the
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Heart (2004);90:893-901
Evaluation of aortic stenosis by cardiovascular magnetic resonance imaging: comparison with established routine clinical techniques
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OBJECTIVE: To evaluate whether direct planimetry of aortic valve area (AVA) by cardiac magnetic resonance (CMR) imaging is a reliable tool for determining the severity of aortic stenosis compared with transthoracic echocardiography (TTE), transoesophageal echocardiography (TOE), and cardiac catheterisation. METHODS: 44 symptomatic patients with severe aortic stenosis were studied. By cardiac catheterisation AVA was calculated by the Gorlin equation. AVA was measured with CMR from steady state free precession (true fast imaging with steady state precession) by planimetry. AVA was also determined from TOE images by planimetry and from TTE images by the continuity equation. RESULTS: Bland-Altman analysis evaluating intraobserver and interobserver variability showed a very small bias for both (-0.016 and 0.019, respectively; n = 20). Bias and limits of agreement between CMR and TTE were 0.05 (-0.35, 0.44) cm2 (n = 37), between CMR and TOE 0.02 (-0.39, 0.42) cm2 (n = 32), and between CMR and cardiac catheterisation 0.09 (-0.30, 0.47) cm2 (n = 36). The sensitivity and specificity of CMR to detect AVA < or = 0.80 cm2 measured by cardiac catheterisation was 78% and 89%, of TOE 70% and 70%, and of TTE 74% and 67%, respectively. CONCLUSION: CMR planimetry is highly reliable and reproducible. Further, CMR planimetry had the best sensitivity and specificity of all non-invasive methods for detecting severe aortic stenosis in comparison with cardiac catheterisation. Therefore, CMR planimetry of AVA with steady state free precession is a new powerful diagnostic tool, particularly for patients with uncertain or discrepant findings by other modalities.

applications. It is anticipated that such developments will be coupled to the utilization of molecular markers to index biologic processes to allow for their in vivo visualization. This combination of biochemical markers and imaging methodology will also usher in an era of molecular imaging during which much progress in the diagnosis and treatment of cardiovascular disease is anticipated.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15364314

Circulation (2004);110:2336-41
Statin-induced cholesterol lowering and plaque regression after 6 months of magnetic resonance imaging-monitored therapy
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BACKGROUND: Statin therapy reduces adverse outcomes, with a minimal decrease in vessel stenosis. Magnetic resonance imaging (MRI) noninvasively detects atherosclerotic plaque (AP) reduction. We hypothesized that statin-induced AP regression can be monitored by MRI and detected earlier than previously reported and is significantly associated with its lipid-lowering effect. METHODS AND RESULTS: APs in thoracic aorta were measured by combined surface/transesophageal MRI in 27 patients (treated with simvastatin 20 to 80 mg daily) before and after 6 months of therapy. AP volume and luminal dimensions were measured from 6 cross sections used to construct a 2.4-cm 3D volume of the aorta that included plaque and lumen. Method reproducibility was studied in 10 patients imaged twice, 1 week apart. AP volume was reduced from 3.3+/-0.1.4 to 2.9+/-1.4 cm3 at 6 months (P<0.02), whereas luminal volume increase was less accentuated (from 12.0+/-3.9 to 12.2+/-3.7 cm3, P<0.06). LDL cholesterol decreased by 23% (from 125+/-32 to 97+/-27 mg/dL, P<0.05) in 6 months. AP regression (plaque volume/area reduction) was significantly related to LDL cholesterol reduction (P<0.02 and P<0.005, respectively), and luminal volume increase

model during MRI at 1.5Tesla. METHODS AND RESULTS: Pacemaker leads with additional thermocouple wires as temperature sensors were implanted in nine animals. Temperature increases of up to 20 degrees C were measured during MRI of the heart. Significant impedance and minor stimulation threshold changes could be seen. However, pathology and histology could not clearly demonstrate heat-induced damage. CONCLUSIONS: MRI may produce considerable heating at the lead tip. Changes of pacing parameters due to MRI could be seen in chronic experiments. Potential risk of tissue damage cannot be excluded even though no reproducible alterations at the histological level could be found.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15618060

J Am Coll Cardiol (2004);43:649-52
Magnetic resonance angiography is equivalent to X-ray coronary angiography for the evaluation of coronary arteries in Kawasaki disease
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OBJECTIVES: The purpose of this study was to compare the results of magnetic resonance angiography (MRA) with X-ray coronary angiography (XCA) in a pediatric population. BACKGROUND: Coronary artery abnormalities in Kawasaki disease (KD) develop in about 15% to 25% of young patients, mostly in the form of aneurysms. METHODS: Thirteen patients (12 male), age three to eight years, were studied. The maximal diameter and length of the aneurysm were recorded. Coronary MRA was performed using a 1.5 T Philips Intera CV

Hospital, London, United Kingdom.
OBJECTIVES: The purpose of this study was to determine the pathologic basis of Q-wave (QW) and non-Q-wave (NQW) myocardial infarction (MI). BACKGROUND: The QW/NQW distinction remains in wide clinical use but the meaning of the difference remains controversial. We hypothesized that measurement of total MI size and transmural extent by late gadolinium enhancement cardiovascular magnetic resonance (CMR) would identify the pathologic basis of QWs. METHODS: A total of 100 consecutive patients with documented previous MI had electrocardiogram and CMR on the same day. Patients with acute MI within seven days were excluded. Left ventricular function and the size and transmural extent of MI were quantified in the three major arterial territories and correlated with the presence of QW. RESULTS: Subendocardial MI showed QW in 28%. Transmural MI showed NQW in 29%. Of all MIs, 48% were at some point transmural, and 99% of these were at some point non-transmural. As MI size and number of transmural segments increased, the probability of QW increased (anterior: total size chi-square = 53, $p < 0.0001$, transmural extent chi-square = 36, $p < 0.0001$; inferior: total size chi-square = 16, $p = 0.001$, transmural extent chi-square = 10, $p = 0.001$). These findings did not hold for lateral MI. In a multivariate model, the transmural extent of MI was not an independent predictor of QW when total size of MI was removed. The QW/NQW classification was a good test for size of MI (area under receiver operating characteristic curve: anterior 0.90, inferior 0.77). CONCLUSIONS: The QW/NQW distinction is useful, but it is determined by the total size rather than transmural extent of underlying MI.

artery stenoses >50%; sensitivity and specificity for detection by dobutamine and adenosine stress and adenosine perfusion were 89% and 80%, 40% and 96%, and 91% and 62%, respectively. Adenosine IWMAs were seen only in segments with >75% transmural perfusion deficit. CONCLUSIONS: DSMR is superior to adenosine stress for the induction of IWMAs in patients with significant coronary artery disease. Visual assessment of adenosine stress perfusion is sensitive with a low specificity, whereas adenosine stress MR wall motion is highly specific because it identifies only patients with high-grade perfusion deficits. Thus, DSMR is the method of choice for current state-of-the-art treatment regimens to detect ischemia in patients with suspected or known coronary artery disease but no history of prior myocardial infarction.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15289384

Am J Cardiol (2004);94:26D-31D; discussion 31D-32D
Cardiovascular magnetic resonance and the role of adenosine pharmacologic stress

Contrast-enhanced magnetic resonance (ce-MR) imaging allows precise delineation of infarct transmurality. An issue of debate is whether data analysis should be performed visually or quantitatively. Accordingly, a head-to-head comparison was performed between visual and quantitative analyses of infarct transmurality on ce-MR imaging. In addition, infarct transmurality was related to the severity of wall motion abnormalities at rest. In 27 patients with long-term ischemic left ventricular (LV) dysfunction (LV ejection fraction 33 +/- 8%) and previous infarction, cine MR imaging (to assess regional wall motion) and ce-MR imaging were performed. Using a 17-segment model, each segment was assigned a wall motion score (from normokinesia to dyskinesia), and segmental infarct transmurality was visually assessed on a 5-point scale (0 = no infarction, 1 = transmurality < or =25% of LV wall thickness, 2 = transmurality 26% to 50%, 3 = transmurality 51% to 75%, and 4 = transmurality 76% to 100%). Quantification of transmurality was performed with threshold analysis; myocardium showing signal intensity above the threshold was considered scar tissue, and percent transmurality was calculated automatically. Wall motion was abnormal in 56% of the 459 segments, and 55% of segments showed hyperenhancement (indicating scar tissue). The agreement between visual and quantitative analyses was excellent: 90% of segments (kappa 0.86) were categorized similarly by visual and quantitative analyses. Infarct transmurality paralleled the severity of contractile dysfunction; 96% of normal or mildly hypokinetic segments had infarct transmurality < or =25%, whereas 93% of akinetic and dyskinetic

transmural extent of hyperenhancement and the recovery in regional function at 6 months (P<0.001). Of a total of 96 previously dysfunctional but nonenhancing or minimally hyperenhancing myocardial segments that did not improve regional function at 6 months, 35 (36%) demonstrated new perioperative hyperenhancement in the early postoperative MRI scan. CONCLUSIONS: Delayed-enhancement MRI is a powerful predictor of myocardial viability after surgery, suggesting an important role for this technique in clinical viability assessment.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15353496

Circulation (2004);109:345-50
Effects of off-pump versus on-pump coronary surgery on reversible and irreversible myocardial injury: a randomized trial using cardiovascular magnetic resonance imaging

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15037539

Circulation (2004);109:2890-6
Lipid-rich atherosclerotic plaques detected by gadofluorine-enhanced in vivo magnetic resonance imaging
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Zena and Michael A. Wiener Cardiovascular Institute and Marie-Josee and Henry R. Kravis Cardiovascular Health Center, Mount Sinai School of Medicine, New York, NY 10029-6574, USA.
BACKGROUND: MRI of specific components in atherosclerotic plaque may provide information on plaque stability and its potential to rupture. We evaluated gadofluorine in atherosclerotic rabbits using a new MR sequence that allows plaque detection within 1 hour after injection and assessed enhancement in lipid-rich and non-lipid-rich plaques.
METHODS AND RESULTS: Twelve rabbits with aortic plaque and 6 controls underwent MRI before and up to 24 hours after gadofluorine injection (50 micromol/kg). Two T1-weighted, segmented gradient-echo sequences (TFL) were compared to enhance

underwent elective, primary CABG, without any other concomitant cardiac surgery, were included. Plasma creatinine kinase MB (CK-MB) and troponin I and T were measured on the first, second and fourth post-operative days. Between the fourth and ninth post-operative days, cardiac MRI was carried out. Infarctions were found in 18 patients. The infarction mass at MRI was numerically largest in patients with transmural infarctions, all of whom had a CK-MB more than five times the upper normal limit. All three cardiac markers correlated to the mass of infarction. CONCLUSION: Elevated biochemical markers after CABG correspond to the amount of peri-operatively infarcted myocardium.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15288156

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BACKGROUND: Despite the reopening of the infarct-related artery (IRA) with infarct angioplasty, complete microvascular reperfusion does not always ensue. METHODS AND RESULTS: We performed cardiovascular MRI (CMR) in 20 acute myocardial infarction (AMI) patients within 24 hours of successful infarct angioplasty and 10 control patients without obstructive coronary artery disease on a clinical 1.5-T CMR scanner. Three-month follow-up CMR in AMI patients evaluated the impact of abnormal reperfusion on recovery of function. Infarction was localized by delayed contrast hyperenhancement and impaired systolic thickening. Microvascular perfusion was assessed at rest by first-pass perfusion CMR after a bolus of gadolinium-DTPA by use of the time to 50% maximum myocardial enhancement. Whereas contrast wash-in was homogeneous in control patients, AMI patients exhibited delays in the hypokinetic region subtended by the IRA compared with remote segments in 19 of 20 patients, with a mean contrast delay of 0.9+/-0.1 seconds (95% CI, 0.6 to 1.2 seconds). At follow-up, the mean recovery of systolic thickening was 725.3603 Tm0 g-Alfred and Baker Heart Research Institu
Australia. andrew.taylor@baker.edu.au
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homogeneous in control patients, AMI patients exhibited delays in the hypokinetic region subtended by the IRA compared with remote segments in 19 of 20 patients, with a mean contrast delay of 0.9+/-0.1 seconds (95% CI, 0.6 to 1.2 seconds). At follow-up, the mean recovery of systolic thickening was lower in segments with a contrast delay of 2 seconds or more (10+/-7% versus 39+/-4%, P<1). A contrast delay > or =2 seconds and infarction > for >75% for transmural infarction). CONCLUSIONS: CMR detects impaired microvascular reperfusion in AMI patients despite successful infarct angioplasty, which when severe is associated with a lack of recovery of wall motion.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=CitatioCirculation (20
In vivo 16-slice, multidetector-row computed tomography for the assessment of experimental atherosclerosis: comparison with magnetic resonance imaging and histopathology
J. F. Viles-Gonzalez, et al.
lar Biology, Research Laboratory, Mount Sinai School of Medicine, New 029, USA.
ND: Noninvasive imaging can detect early atherosclerotic disease. sonance imaging (MRI), because of its excellent spatial resolution, is blished as a tool for plaque characterization. Sixteen-slice, multidetector-row computed tomography (MDCT) was re aging, with promising results for noninvasive angiography. We compared es of MDCT and MRI for the assessment of noncalcified, atherosclerotic THODS AND RESULTS: Six atherosclerotic rabbits underwent in vivo MDCT and 1.5-T MRI. MDCT parameters were 120 kV, 120 mA/s, 2x0.75, and spatial resolution 0.6x0.6 mm. MRI parameters were as roton density, repetition time/echo time (TR/TE) 2300/5.6; for T2, TR/TE l for T1, TR/TE 800/5.6; slice thickness was 3 mm and spatial resolution, Blinded analysis of 3-mm axial reconstructions from MDCT and the carefully matched MRI images (182 sections) sh both modalities. MDCT yielded a slightly larger lumen area, anteroposterior diameters and lateral diameters, with no significant differences in total vessel area. The sensitivi

and specificity, respectively, to detect noncalcified, atherosclerotic plaques were 89% and 77% for MDCT and 97% and 94% for MRI. Fibrous-rich and lipid-rich plaque could not be differentiated visually, although they showed different attenuation properties (116+/-27 vs 51+/-25 Hounsfield units, P<0.01). CONCLUSIONS: Both techniques allow reliable detection of noncalcified, atherosclerotic plaques and accurate assessment of vessel areas and diameters. MDCT offers the additive value of a very short image acquisition time when compared with MRI. The subtle measurement differences found between modalities may be due to the better spatial resolution of MRI, which probably